

Discussion Paper

Power Distribution Sector

Key insights

- Private sector participation in the distribution sector remains minimal, with 93% of the electricity by both volume and revenue sold through state government-owned distribution utilities.
- Distribution utilities have persistently witnessed poor financial performance. Key reasons include high technical and commercial losses and underpricing of tariffs.
- Only six states achieved the renewable purchase obligation (RPO) target of 17.5% in 2019-20.
- Adoption of open access has been below potential due to high surcharges levied to protect cross-subsidy. It has been observed that discoms create operational barriers, as they may lose high-paying consumers.

The electricity sector requires significant investments in creating the necessary infrastructure such as generating stations, transmission and distribution lines. It also requires significant planning to ensure adequate capacity building in advance to cater to demand. Unlike most other goods, electricity cannot be stored at scale. This requires supply and demand to be matched at all instances. Mismatch may lead to issues of grid safety and availability of power, hence, continued coordination between all players in the value chain is required. These are key considerations for the regulation of the sector.

For regulation, the electricity sector has been demarcated into three sub-sectors, i.e., generation, transmission, and distribution.¹ Generation is the process of producing power using various sources of energy. Transmission refers to carrying high voltage power from generation plants to distribution sub-stations through a transmission grid. Distribution refers to transferring electricity from sub-stations to individual consumers via a distribution network. Generation was delicensed and opened to private investment in 1991.² Transmission and Distribution are licensed activities as per the Electricity Act, 2003. In August 2022, the Electricity (Amendment) Bill, 2022 was introduced in Lok Sabha to amend the 2003 Act.³ The Bill seeks to introduce certain changes in the way the distribution sector is governed. In this light, we discuss the market structure and financial position of distribution utilities and some of the underlying issues. We also discuss the experience with open access and renewable purchase obligation, two important provisions in the 2003 Act, to promote consumer choice and energy transition, respectively.

Distribution Sector: Market Structure and Competition

Since the enactment of the Electricity Act, 2003, generation, transmission, and distribution activities of the erstwhile state electricity boards in many states have been entrusted with separate state government-owned companies (Table 6 in Annexure). In almost all parts of the country, electricity distribution is a local monopoly business, i.e., a single company, typically a state government-owned entity, serves all consumers in a given area. These companies have long-term bilateral contracts with generators which are government as well as private companies, to meet a majority of its expected demand. Tariffs for power procured from generators are regulated by Regulatory Commissions, except where the tie-up is through competitive bidding. The Act provides for the regulation of the tariff for retail sales through State Electricity Regulatory Commissions. Coal is the major source of electricity generation (about 75% in 2021-22). 80% of the coal is produced by Coal India Limited (CIL), a major portion of which is sold at notified prices.^{4,5}

Although private participation is permitted, their presence among discoms is limited. In 2019-20, the state government-owned enterprises and power departments taken together had a 93% share in the electricity distribution sector by both revenue earned and volume of energy sold.⁶ The experience with private sector participation in distribution has been mixed. The distribution segment in Delhi was privatised in 2002, with the wire and supply business transferred to privately-owned companies.⁷ Delhi saw a reduction in its aggregate technical and commercial (AT&C) losses and an improvement in the financial health of discoms. Between 2001-02 and 2018-19, AT&C losses reduced from 45% to 9%, and discoms started earning profits.⁷ AT&C losses refer to the ratio of power for which the discom did not receive any payment to the total electricity procured by the utility. Note that the consumer base in Delhi is largely urban, where consumers are densely populated. In 1999, discoms in Odisha were also privatised, but it was reversed in 2015 due to failure in reducing AT&C losses, and the continued financial stress of discoms.⁷ Mumbai is one notable area where two discoms operate in the same area.⁹

Considerations for promoting competition

The Act permits multiple distribution licensees to compete and provide electricity in a given area, through their 'own network'. This means that each discom operating in an area would require to lay its own network of wires from the sub-station to the consumer. This would lead to a replication of network, and a rise in costs for end-consumers as capital costs would be passed on directly or indirectly.^{2,8,9}

The distribution business can be further demarcated into: (i) wire – the physical network which brings electricity from a high-voltage transmission system to the local area or the point of consumption, and (ii) supply- the business of procuring power from generators and supplying it to end-consumer, billing, and collection. Wire business is a natural monopoly, whereas supply business is considered more suitable for a competitive multi-player market.¹⁰ Competition in supply is expected to provide improvement in efficiency and loss reduction by a clearer demarcation of responsibilities, i.e., network improvement in the case of the wire company, and efficiency in power procurement and consumer interface in case of the supply company.¹⁰ Further, it is expected to enable choice for consumers to switch between suppliers, which would put pressure for better quality of supply, lower tariff, and improved customer service.¹⁰

The Forum of Regulators (2013) had observed that for competition in the retail supply business, the following are key pre-requisites: (i) development of a wholesale power market with the presence of multiple players, and avoiding dominant players, (ii) cost-reflective tariffs, (iii) distinct ownership of wire and supply segment to avoid conflict of interest, (iv) plan for treatment of existing distribution and financial losses, (v) suitable supply infrastructure including advanced metering, (vi) ease of switching between suppliers.¹⁰

Since 2014, at multiple instances, amendments to the Electricity Act, 2003 have been proposed to provide for such segregation (see Table 5 in annexure).^{11,12,13} In August 2022, the Electricity (Amendment) Bill, 2022 was introduced in Lok Sabha to amend the 2003 Act.³ The Bill seeks to remove the requirement to own a network to distribute electricity.³

Financial Losses of Distribution Utilities

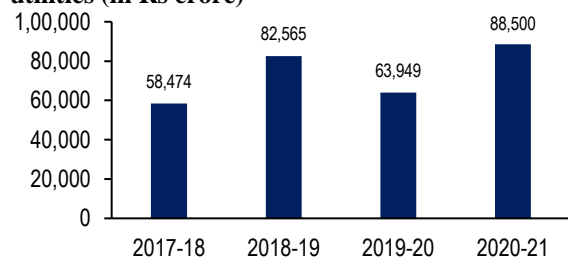
The distribution segment is the interface between consumers and the entire value chain of the power sector, and thus, is key to revenue realisation for the entire sector. Discoms have continued to register financial losses, and have required government support from time to time to be bailed out from these situations (Table 1). In four years between 2017-18 and 2020-21, discoms have accumulated losses worth about three lakh crore rupees (Figure 1). Total borrowings of discoms have increased from Rs 4.6 lakh crore in 2017-18 to Rs 5.9 lakh crore in 2020-21 (Table 2).⁶ As per the Power Finance Corporation, the net worth of these utilities continues to be negative.⁶ Persistent financial problems result in delays in payments and non-payment of outstanding dues to generators, which in turn also impacts their fuel suppliers, i.e., coal companies.

Table 1: Key government schemes for the turnaround of the distribution sector over the years

Year	Scheme	Details
2002	Bailout Package	States take over the debt of state electricity boards worth Rs 35,000 crore, 50% waiver of interest payable by state electricity boards to central PSUs
2012	Financial Restructuring Package	States take over 50% of the outstanding short-term liabilities worth Rs 56,908 crore
2015	Ujwal Discom Assurance Yojana (UDAY)	States take over 75% of the debt of discoms worth Rs 2.3 lakh crore and also provide grants for any future losses
2020	Liquidity Infusion Scheme	Discoms get loans worth Rs 1.35 lakh crore from Power Finance Corporation and REC Limited to settle outstanding dues of generators, state governments provide guarantee
2022	Revamped Distribution Sector Scheme	Central government to provide result-linked financial assistance worth Rs 97,631 crore for strengthening of supply infrastructure

Sources: NITI Aayog, Press Releases of the Ministry of Power; PRS.

Figure 1: Cumulative losses of distribution utilities (in Rs crore)



Note: Figures correspond to Profit/(Loss) with Tariff Subsidy Received Excluding Revenue Grant under UDAY and Regulatory Income.

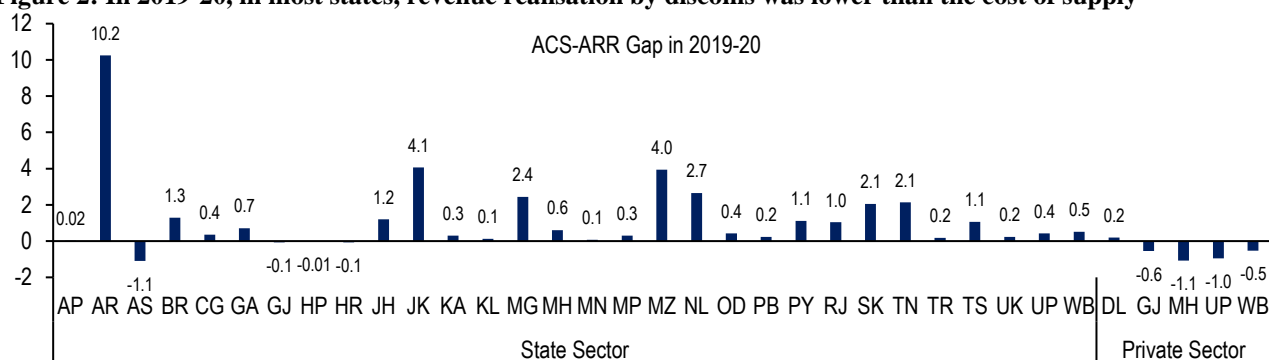
Source: Reports on Performance of Power Utilities, Power Finance Corporation; PRS.

Table 2: Total outstanding debt of distribution utilities (in Rs crore)

Year	Outstanding Debt	Of which Borrowings from State Government
2017-18	4,64,849	1,30,098
2018-19	4,93,045	99,343
2019-20	5,05,246	76,021
2020-21	5,86,194	67,848

Note: Borrowings from state governments have seen a decline, as debt has been converted into equity by multiple states.

Source: Reports on Performance of Power Utilities, Power Finance Corporation; PRS.

Figure 2: In 2019-20, in most states, revenue realisation by discoms was lower than the cost of supply

Note: ACS: Average Cost of Supply; ARR: Average Revenue Realisation. Although the latest figures are available up to 2020-21, figures for the previous year 2019-20 have been shown here, as 2020-21 was a non-standard year due to the impact of COVID-19 and related lockdowns.

Sources: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Table 3: Cost Structure of Distribution Utilities in 2019-20 (in Rs/kWh)

Cost Head	State Sector	Private Sector
Cost of Power	4.70	5.17
Employee Cost	0.51	0.49
Interest Cost	0.41	0.57
Depreciation	0.21	0.30
Other Costs	0.26	0.47
Total	6.09	6.99

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

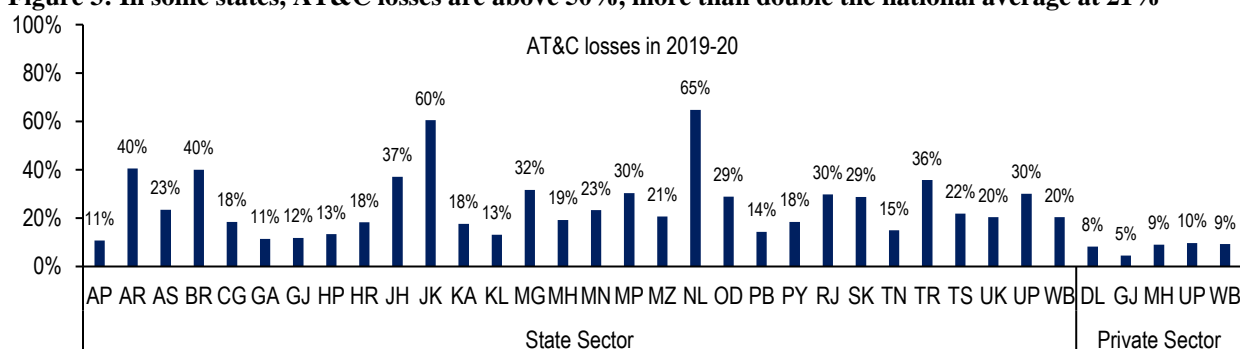
Table 4: Revenue Structure of Distribution Utilities in 2019-20 (in Rs/kWh)

Revenue Head	State Sector	Private Sector
Revenue from Operations	4.24	6.79
Tariff Subsidy Billed	1.01	0.35
Regulatory Income	0.08	0.31
Revenue Grants under UDAY	0.13	0
Other Income and Revenue Grants	0.34	0.12
Total	5.80	7.56

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Some key underlying reasons for such a financial situation are discussed below.

- Technical and Commercial Losses:** In 2019-20, on aggregate, distribution utilities could bill only 85% of the electricity they injected into the grid. Further, they collected only 93% of the amount they billed.⁶ This amounted to aggregate technical and commercial losses of 21%.⁶ AT&C losses range between as low as 8% in Delhi (mostly urban area), and as high as 60% and 65% in Jammu and Kashmir and Nagaland, respectively.⁶ These losses can be attributed to: (i) technical losses which include some unavoidable loss in energy transfer, (ii) inefficiencies in energy transfer due to the sub-optimal condition of the network, and (iii) commercial losses such as theft by tapping in and bypassing metering, inadequate metering, and payment default by consumers. The Revamped Distribution Sector Scheme, launched in 2021, seeks to bring down AT&C losses to 12%-15% by 2024-25.¹⁴
- Figure 3: In some states, AT&C losses are above 50%, more than double the national average at 21%**



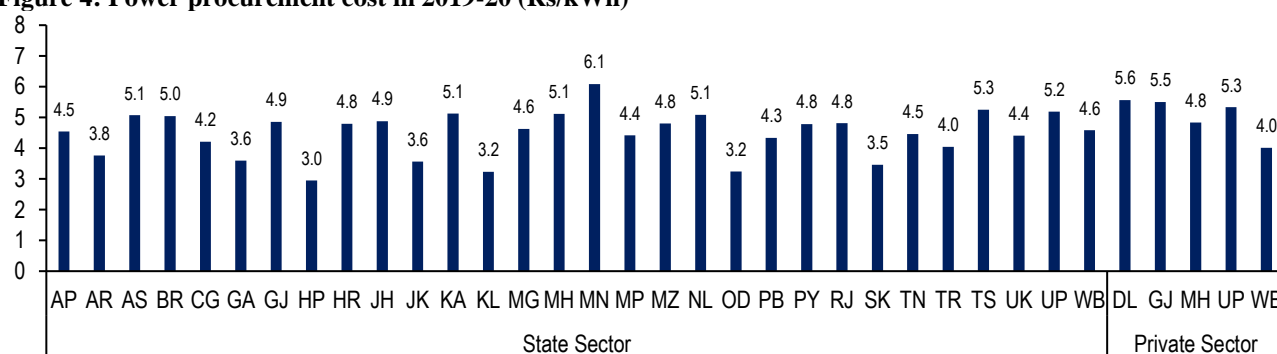
Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

- Under-pricing of tariff:** Tariffs charged to consumers are regulated by State Electricity Regulatory Commissions. Often, tariffs are designed on a multi-year basis. At times, they are designed such that the tariff is lower than the cost in initial years, and cost recovery is offloaded to upcoming years. These costs, recoverable in future, are termed regulatory income. For instance, in 2020-21, West Bengal discoms booked a regulatory income of Rs 4,061 crore, about 15% of their expected revenue.⁶ In the same year, Delhi discoms booked a regulatory income of Rs 2,743 crore, about 12% of their expected revenue.⁶ However, non-recovery of costs would add up as annual losses for discoms. This would also require

discoms to incur costs on working capital loans. Tamil Nadu discom TANGEDCO, which observes lower AT&C losses than the national average, has been the among the highest loss-making discoms in the country for four consecutive years (see Table 7 in annexure). This situation is likely due to under-pricing of tariffs. A white paper released by the Tamil Nadu government (2021) had observed that electricity tariffs were not revised in Tamil Nadu for seven years.¹⁵ The 2022 Bill seeks to provide that tariff should recover all prudent costs incurred for supply of electricity.³

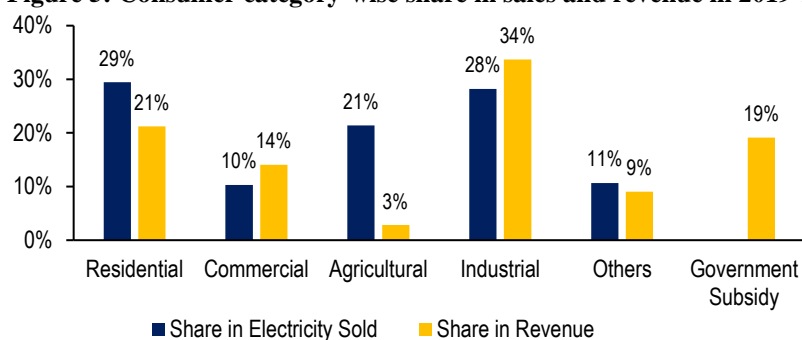
- **Power Procurement Cost:** Power procurement costs constitute about 70%-80% of the total costs of discoms. Power procurement cost varies significantly across states, from as low as about Rs 3-3.5 per kWh in Kerala and Himachal Pradesh, to as high as Rs 5.5-6 per kWh in states such as Delhi and Manipur. A study report for NITI Aayog (2021) observed that discoms have entered into expensive and long-term thermal PPAs based on incorrect estimates of power demand.¹⁶ Fixed costs of the excess capacity must be paid, even if power is not generated by the generation company. In many states, a high percentage of power demand is tied up in long-term contracts.¹⁶ Gujarat, Karnataka and Rajasthan have almost 100% of their maximum demand tied up.¹⁶ While these arrangements give security in planning supply, they limit the discoms' ability to take advantage of lower power costs in short-term markets. Fixed costs, which are roughly 47% of the cost will still have to be paid under these long-term contracts if the discom looks for alternative cheaper sources for procuring power.⁷

Figure 4: Power procurement cost in 2019-20 (Rs/kWh)



Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

- **Recovery of fixed costs:** Tariffs charged by generators to discoms have a two-part structure: (i) fixed cost which covers factors such as return on equity, depreciation of assets, tax liabilities of generators, and operation and maintenance costs, (ii) variable cost, which primarily covers fuel costs.⁷ A report released by NITI Aayog (2019) observed that retail tariffs charged to consumers also follow the two-part structure, however, their fixed charges component does not adequately cover fixed costs payable to generators.⁷ It determined that while payments on account of fixed costs were in the range of 40%-74% of the total costs, recovery from consumers on account of fixed charges was in the range of only 13%-27% of the total revenue.⁷ This results in a cashflow mismatch for discoms, which requires them to incur expenses on working capital loans.
- **Government subsidy:** The state government may choose to provide subsidies to keep prices lower for certain categories of consumers. In the last few years, government subsidy has contributed about 15%-20% of discoms' revenue. While determining the retail tariff, the regulators make adjustments for the subsidy. However, states may not pay all the subsidies booked by discoms in the same financial year. For example, in 2020-21, discoms received only 85% of the subsidy they billed.⁶ The corresponding percentage for 2018-19 and 2019-20 was 90% and 95%, respectively.⁶ There may be delays in payments on a month-on-month basis, which require discoms to fill the gap through working capital loans.⁷ Interest paid on such loans adds to the costs. Direct benefit transfer of subsidy has been proposed to address some of the issues with subsidy targeting and disbursement.¹³
- **Cross-subsidy:** Cross-subsidy is a tariff mechanism where some consumer categories pay a higher price to subsidise the consumption of other consumer categories. Typically, industrial and commercial consumers cross-subsidise the consumption of residential and agricultural consumers. In many states, cross-subsidies have been higher than the long-term policy goal of limiting it within $\pm 20\%$ of the average cost of supply.⁷ Higher electricity prices may make industries uncompetitive. This may create an incentive for them to look for direct procurement from generators or set up their own power plants. In turn, this may make discoms lose out on consumers with higher consumption levels and higher paying capacity. This would adversely affect their revenue prospects. Cross-subsidy could also incentivise theft of power. Cross-subsidy along with explicit government subsidy pay for the provisioning of unmetered free power in many parts of the country. Not metering consumption may encourage injudicious use of electricity, and also leads to accounting issues for discoms. It has been observed that unmetered free power to farms has had an adverse impact on groundwater levels due to the injudicious use of tube wells.¹⁷

Figure 5: Consumer category-wise share in sales and revenue in 2019-20

Note: Others includes public utilities, railway traction, inter-state, and bulk supply.

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Open Access

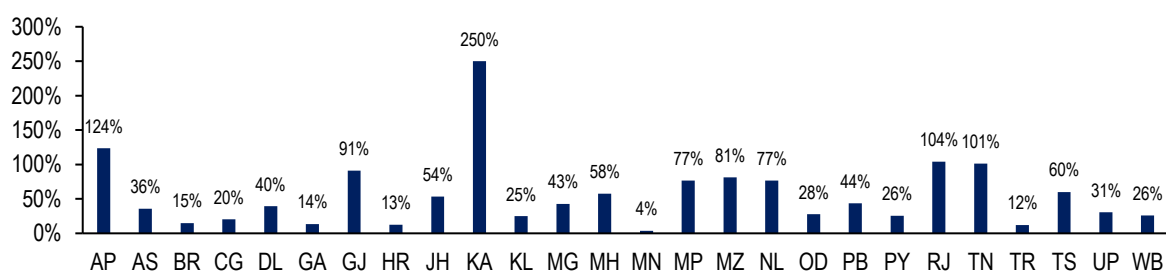
As per the Electricity Act, consumers with a demand of 1 MW and above are permitted to procure electricity from sources other than the local discom.¹⁸ Discoms and transmission companies are mandated to provide such consumers with non-discriminatory access to their network. Wheeling charges and certain other charges such as cross-subsidy surcharge are payable for such access. This mechanism is commonly referred to as open access. Open access aims to: (i) induce efficiency improvement in electricity distribution companies through healthy competition in the power market, (ii) provide choice to consumers for procuring power from their preferred supplier.¹⁹ Consumers would opt for open access to benefit from lower prices elsewhere.

Various reports have highlighted that adoption of open access has been below potential.^{10,20} One of the key reasons has been high surcharges levied by regulatory commissions to protect the prevailing cross-subsidy level. If large consumers move away from the local discom, the cross-subsidy level for other consumers of that discom gets adversely impacted. Hence, a cross-subsidy surcharge was envisaged under the Electricity Act to protect the subsidy level. However, these high charges lead to open access becoming financially unattractive. A 2019 study for NITI Aayog also highlighted some operational barriers observed with open access: (i) distribution and transmission licensees denying access citing capacity constraints, (ii) onerous conditions regarding the minimum level of drawl and advance scheduling of power despatch (citing grid discipline), and (iii) delay in executing maintenance requests.⁷

Renewable Purchase Obligation

To promote clean energy transition, the Electricity Act, 2003 empowers SERCs to specify a renewable purchase obligation (RPO). RPO refers to a minimum percentage of electricity that discoms are required to purchase from renewable sources such as solar, wind, and biomass. In 2019-20, the uniform RPO target mandated by the Union Ministry of Power was 17.5%.²¹ Against this, the achievement at all India level was 10.8%.²¹ In 2019-20, six states met this RPO target. These are Karnataka, Andhra Pradesh, Rajasthan, Tamil Nadu, Himachal Pradesh, and Sikkim.²¹ The Ministry of Power had noted that the reasons for non-compliance include the perception of some discoms that: (i) renewable energy costs more than other energy sources, and (ii) additional costs associated with renewable energy integration may be very high.²¹ It further observed that these are largely associated with system inertia.²¹

The 2022 Bill adds that RPO should not be below a minimum percentage prescribed by the central government.³ The failure to meet RPO will be punishable with a penalty between 25 and 50 paise per kilowatt of the shortfall.³ In July 2022, the Union Ministry of Power prescribed RPO target for the period between 2022-23 and 2029-30.²² The RPO target is set to rise from 24.6% in 2022-23 to 43.3% in 2029-30.²²

Figure 6: RPO Compliance level in 2019-20 against the target

Note: Data not available for certain states – Himachal Pradesh, Sikkim, Jammu and Kashmir, and Uttarakhand. The above chart refers to compliance against the target of 17.5% of the total power requirement to be met from renewable energy sources.

Source: 17th Report: Action Plan for Achievement of 175 GW Renewable Energy Target, Standing Committee on Energy, March 2021; PRS.

Annexure

Table 5: Comparison of the 2014 Bill, the 2018 Draft Bill, the 2020 Draft Bill, and the 2022 Bill to amend the Electricity Act, 2003

2003 Act	2014 Bill	2018 Draft Bill	2020 Draft Bill	2022 Bill
Distribution Market Structure				
<ul style="list-style-type: none"> ▪ Distribution market structure: More than one distribution licensee can supply electricity in the same area through their own network. 	<ul style="list-style-type: none"> ▪ Segregation of wire and supply: Separate license for distribution network and supply, only one license to be given for network, there may be more than one supplier, at least one supply licensee should be a government company. ▪ Provider of last resort: One company to be designated as a provider of last resort ▪ Power procurement: All existing PPAs of incumbent discoms will be vested in an intermediary company. 	<ul style="list-style-type: none"> ▪ Segregation of wire and supply: Separate license for distribution network and supply, there could be more than one distribution as well as supply licensees, the requirement for government supply company removed. ▪ Power procurement: Provision regarding intermediary company same as 2014 Bill. All power procurement should be through PPAs. 	<ul style="list-style-type: none"> ▪ Distribution sub-licensee: A discom may appoint a distribution sub-licensee to distribute electricity on its behalf, with prior permission from SERC 	<ul style="list-style-type: none"> ▪ Distribution license without own network requirement: A distribution licensee need not own a network to supply electricity, it will be given open access to a network owned by other discoms on payment of wheeling charges ▪ CERC to issue distribution license: CERC is empowered to issue a license for distribution licensee to operate in more than one state ▪ Power procurement: All existing PPAs will be shared among the incumbent and new discoms. SERC to specify arrangements, and the central government to frame rules in this regard
Retail Tariff and Subsidies				
<ul style="list-style-type: none"> ▪ Tariff determination: In case of more than one discom in the same area, SERC may specify a ceiling tariff ▪ Cost-reflective tariff: Tariff should progressively reflect the cost of supply. ▪ Cross-subsidy: Cross-subsidy should be progressively reduced in accordance with the trajectory determined by SERC, and as per the guidance under National Tariff Policy 	<ul style="list-style-type: none"> ▪ Retail Tariff determination: Supply tariff open to competition but subject to a ceiling tariff decided by SERC, distribution tariff to be determined by SERC ▪ Recovery of prudent costs: Tariff should recover prudent costs of supply ▪ Cross-subsidy: Reduce cross-subsidy in accordance with the National Tariff Policy 	<ul style="list-style-type: none"> ▪ Retail Tariff determination: same as the 2014 Bill ▪ Cross-subsidy: Eliminate cross-subsidy within three years of enactment ▪ DBT of government subsidy: Government subsidy should be disbursed through direct benefit transfer to consumers 	<ul style="list-style-type: none"> ▪ Cost-reflective tariff: Tariff must reflect the cost of supply. ▪ Cross-subsidy: Reduce cross-subsidy in accordance with the National Tariff Policy ▪ DBT of government subsidy: Similar to the 2018 Draft Bill 	<ul style="list-style-type: none"> ▪ Retail Tariff determination: Supply tariff open to competition but subject to a ceiling and a floor tariff decided by SERC ▪ Cross-subsidy: Progressively reduce cross-subsidy in accordance with the regulations of CERC

Sources: The Electricity (Amendment) Bill, 2014 and The Electricity (Amendment) Bill, 2022 as introduced in Lok Sabha, Draft Amendments to the Electricity Act, 2003 released in September 2018 and April 2020.

Table 6: Distribution Utility Ownership Structure (2020-21)

Supplier	States/UTs
Power Department	Arunachal Pradesh Goa Jammu and Kashmir Mizoram Nagaland Sikkim
State Government-owned Distribution Company	Andhra Pradesh Assam Bihar Chhattisgarh Gujarat Haryana Jharkhand Karnataka Madhya Pradesh Maharashtra Meghalaya Odisha Rajasthan Telangana Uttar Pradesh Uttarakhand West Bengal
State Government-owned Company (integrated generation and distribution utility)	Himachal Pradesh Kerala Manipur Punjab Tamil Nadu Tripura
Joint venture between Private Company and State	Delhi Uttar Pradesh [#]
Private Sector*	Gujarat Maharashtra West Bengal

Note: [#]Only in Noida city. ^{*}Presence limited to a few cities – Ahmedabad in Gujarat, Mumbai in Maharashtra, and Asansol and Kolkata in West Bengal.

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Table 7: Profit After Tax (+) /Loss (-) registered by discoms (Rs crore)

State	2017-18	2018-19	2019-20	2020-21
State Sector	-59,997	-84,622	-65,049	-88,500
Andhra Pradesh	-546	-16,831	-266	-7,350
Arunachal Pradesh	-429	-420	-467	-569
Assam	-259	311	1,141	-107
Bihar	-1,872	-1,845	-2,913	-2,470
Chhattisgarh	-739	-814	163	-219
Goa	26	-121	-276	-215
Gujarat	426	184	314	446
Haryana	412	281	331	637
Himachal Pradesh	-44	132	43	-154
Jammu & Kashmir	-2,999	-2,902	-3,460	-3,274
Jharkhand	-212	-730	-1,111	-2,556
Karnataka	-2,439	-4,889	-2,501	-5,382
Kerala	-784	-135	-270	-1,822
Madhya Pradesh	-5,802	-9,713	-5,034	-9,883
Maharashtra	-3,927	2,549	-5,018	-6,824
Manipur	-8	-42	-30	-15
Meghalaya	-287	-202	-456	-425
Mizoram	87	-260	-51	-440
Nagaland	-62	-94	-94	-143
Odisha	-792	-1,539	-842	-928
Puducherry	5	-39	-306	-11
Punjab	-2,760	363	-975	49
Rajasthan	-11,314	-12,524	-12,277	-5,994
Sikkim	-29	-3	-179	-74
Tamil Nadu	-12,541	-17,186	-16,528	-17,970
Telangana	-6,697	-9,525	-6,966	-6,686
Tripura	28	38	-104	1
Uttar Pradesh	-5,269	-5,902	-3,866	-11,155
Uttarakhand	-229	-808	-323	-152
West Bengal	-871	-1,171	-1,867	-4,261
Private Sector	1,523	2,057	1,100	0
Delhi	109	657	-975	-1,374
Gujarat	574	307	612	655
Maharashtra	-	590	912	-12
Uttar Pradesh	182	126	172	333
West Bengal	658	377	379	398
All-India	-58,474	-82,565	-63,949	-88,500

Note: Figures reported as per actual government subsidy received, and after excluding regulatory income and revenue grant under UDAY.

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Table 8: Cost structure in 2020-21 (Rs/kWh)

State	Cost of Power (including own generation)	Employee Cost	Interest Cost	Depreciation	Other Costs	Total
State Sector	4.7	0.5	0.4	0.2	0.3	6.2
Andhra Pradesh	4.9	1.0	0.3	0.2	0.1	6.5
Arunachal Pradesh	3.7	2.9	-	-	0.5	7.0
Assam	5.3	0.6	0.2	0.3	0.5	6.8
Bihar	5.1	0.3	0.2	0.4	0.2	6.2
Chhattisgarh	4.3	0.4	0.1	0.1	0.0	4.9
Goa	3.6	0.8	0.0	0.2	0.3	4.8
Gujarat	4.6	0.2	0.0	0.2	0.1	5.2
Haryana	4.4	0.5	0.1	0.2	0.1	5.2
Himachal Pradesh	3.0	1.4	0.4	0.3	0.1	5.1
Jammu & Kashmir	3.5	-	-	-	0.6	4.1
Jharkhand	4.5	0.2	0.3	0.8	0.3	6.1
Karnataka	5.4	0.6	0.4	0.3	0.3	7.1
Kerala	3.1	2.0	0.7	0.4	0.4	6.5
Madhya Pradesh	4.6	0.4	0.4	0.2	0.3	5.9
Maharashtra	4.8	0.4	0.4	0.3	0.5	6.4
Manipur	5.7	0.6	0.0	0.2	0.2	6.7
Meghalaya	4.1	0.8	0.4	0.1	0.2	5.6
Mizoram	5.7	2.6	0.0	0.6	2.2	11.2
Nagaland	5.4	1.8	-	1.8	0.4	9.3
Odisha	3.1	0.6	0.1	0.1	0.5	4.4
Puducherry	4.2	0.4	0.2	0.1	0.1	5.0
Punjab	4.1	0.8	0.3	0.2	0.2	5.7
Rajasthan	4.8	0.3	1.0	0.3	0.3	6.7
Sikkim	2.6	1.5	-	0.3	0.2	4.4
Tamil Nadu	4.5	1.0	1.2	0.3	0.1	7.2
Telangana	5.2	0.6	0.4	0.2	0.0	6.5
Tripura	3.9	0.6	0.1	0.1	0.2	4.8
Uttar Pradesh	5.5	0.2	0.6	0.2	0.4	6.9
Uttarakhand	4.0	0.3	0.1	0.2	0.2	4.7
West Bengal	4.8	0.4	0.4	0.3	0.3	6.1
Private Sector	4.9	0.6	0.6	0.4	0.5	7.0
Delhi	5.1	0.5	1.0	0.3	0.4	7.3
Gujarat	5.4	0.2	0.3	0.4	0.3	6.6
Maharashtra	4.6	0.9	0.2	0.5	0.9	7.1
Uttar Pradesh	4.9	0.2	0.1	0.3	0.3	5.8
West Bengal	4.0	0.9	0.5	0.5	0.8	6.7
All-India	4.7	0.5	0.5	0.2	0.3	6.2

Note: Figures reported based on gross input energy.

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Table 9: Revenue structure in 2020-21 (Rs/kWh)

State	Revenue from Operations	Tariff Subsidy Billed	Regulatory Income	Revenue Grant under UDAY for loan takeover	Other Income and Revenue Grants	Total (on Tariff Subsidy Billed basis)	Tariff Subsidy Received	Total (on Tariff Subsidy received (excluding Regulatory Income and Revenue Grant under UDAY for loan takeover))
State Sector	4.1	1.1	0.1	0.1	0.4	5.7	0.9	5.4
Andhra Pradesh	4.6	1.5	0.0	-	0.5	6.5	0.6	5.6
Arunachal Pradesh	2.0	-	0.0	-	0.0	2.0	0.0	2.0
Assam	4.9	0.4	0.0	-	1.2	6.5	0.6	6.7
Bihar	3.1	1.8	0.0	-	0.8	5.7	1.6	5.5
Chhattisgarh	3.3	1.2	0.0	-	0.3	4.8	1.2	4.9
Goa	3.5	0.8	0.0	-	0.1	4.3	0.8	4.3
Gujarat	4.4	0.7	0.0	-	0.1	5.2	0.7	5.2
Haryana	4.1	1.0	0.0	-	0.2	5.3	1.0	5.3
Himachal Pradesh	4.4	0.4	0.0	-	0.2	5.0	0.4	5.0
Jammu & Kashmir	1.7	0.7	0.0	-	0.0	2.3	0.7	2.3
Jharkhand	2.6	1.0	0.0	-	0.9	4.4	0.8	4.2
Karnataka	4.3	1.9	0.0	-	0.2	6.5	1.7	6.3
Kerala	5.4	0.2	0.0	-	0.3	5.8	0.2	5.8
Madhya Pradesh	2.5	2.4	0.0	-	0.4	5.3	1.7	4.6
Maharashtra	4.9	0.7	0.2	0.1	0.4	6.3	0.6	5.9
Manipur	4.1	2.5	0.0	-	0.1	6.6	2.5	6.6
Meghalaya	3.7	0.1	0.0	-	0.2	3.9	0.1	3.9
Mizoram	5.0	1.2	-	-	0.1	6.3	0.0	5.1
Nagaland	2.6	-	-	-	5.0	7.5	0.0	7.5
Odisha	3.9	-	0.0	-	0.1	4.0	0.0	4.0
Puducherry	4.9	0.0	-	-	0.0	4.9	0.0	4.9
Punjab	3.6	1.9	-	-	0.4	5.9	1.7	5.7
Rajasthan	4.0	1.9	-	-	0.5	6.4	1.5	6.0
Sikkim	3.8	0.0	-	-	0.0	3.9	0.0	3.8
Tamil Nadu	3.4	0.9	-	0.5	0.8	5.7	0.9	5.1
Telangana	4.2	0.9	-	-	0.3	5.4	0.9	5.4
Tripura	4.6	0.2	-	-	0.1	4.9	0.1	4.9
Uttar Pradesh	4.8	0.7	-	-	0.4	5.9	0.7	5.9
Uttarakhand	4.4	-	-	-	0.2	4.7	0.0	4.7
West Bengal	4.6	0.3	0.9	-	0.2	6.1	0.3	5.2
Private Sector	6.4	0.5	0.6	-	0.1	7.6	0.5	7.0
Delhi	5.7	1.0	0.9	-	0.1	7.8	1.0	6.8
Gujarat	7.1	-	-	-	0.1	7.2	0.0	7.2
Maharashtra	7.1	-	0.7	-	0.0	7.8	0.0	7.1
Uttar Pradesh	7.2	-	-1.0	-	0.1	6.3	0.0	7.3
West Bengal	6.9	-	0.4	-	0.2	7.5	0.0	7.0
All-India	4.2	1.1	0.1	0.0	0.4	5.8	0.9	5.5

Note: Figures reported based on gross input energy.

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

Table 10: Billing Efficiency, Collection Efficiency, and AT&C Losses

State	2019-20			2020-21		
	Billing Efficiency	Collection Efficiency	AT&C Losses	Billing Efficiency	Collection Efficiency	AT&C Losses
State Sector	85%	92%	22%	84%	92%	23%
Andhra Pradesh	92%	97%	11%	92%	79%	27%
Arunachal Pradesh	60%	100%	40%	55%	100%	45%
Assam	81%	95%	23%	81%	100%	19%
Bihar	75%	80%	40%	75%	86%	35%
Chhattisgarh	82%	100%	18%	83%	96%	20%
Goa	89%	100%	11%	88%	99%	13%
Gujarat	90%	98%	12%	88%	100%	12%
Haryana	84%	98%	18%	83%	100%	17%
Himachal Pradesh	88%	99%	13%	86%	100%	14%
Jammu & Kashmir	50%	79%	60%	47%	87%	59%
Jharkhand	78%	81%	37%	65%	90%	41%
Karnataka	88%	94%	18%	88%	96%	15%
Kerala	91%	95%	13%	92%	100%	8%
Madhya Pradesh	80%	87%	30%	77%	76%	41%
Maharashtra	87%	92%	19%	85%	87%	27%
Manipur	81%	95%	23%	86%	93%	20%
Meghalaya	70%	97%	32%	69%	100%	31%
Mizoram	79%	100%	21%	71%	89%	37%
Nagaland	47%	75%	65%	51%	77%	60%
Odisha	79%	90%	29%	76%	93%	29%
Puducherry	87%	93%	18%	88%	91%	20%
Punjab	88%	97%	14%	89%	93%	18%
Rajasthan	83%	85%	30%	81%	91%	26%
Sikkim	71%	100%	29%	71%	100%	29%
Tamil Nadu	86%	99%	15%	88%	98%	14%
Telangana	92%	85%	22%	92%	94%	13%
Tripura	70%	92%	36%	72%	88%	37%
Uttar Pradesh	82%	86%	30%	79%	91%	27%
Uttarakhand	87%	92%	20%	86%	98%	15%
West Bengal	81%	98%	20%	79%	100%	21%
Private Sector	93%	99%	8%	92%	98%	9%
Delhi	93%	99%	8%	92%	99%	9%
Gujarat	95%	100%	5%	95%	99%	6%
Maharashtra	93%	98%	9%	92%	99%	9%
Uttar Pradesh	92%	98%	10%	92%	99%	10%
West Bengal	91%	100%	9%	92%	94%	13%
All-India	85%	93%	21%	84%	92%	22%

Source: Report on Performance of Power Utilities 2020-21, Power Finance Corporation; PRS.

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